## CLAIMS

We claim:

1. A molecular separator apparatus, comprising:

at least one separator with at least one annulus disposed therein;

a flux cartridge with a semi-permeable membrane seated inside said annulus, wherein a fluid ring exists between an interior surface of the annulus and an exterior surface of the flux cartridge;

a first pump in fluid communication with the separator capable of delivering an influent fluid containing at least one contaminant into the separator, wherein the pressure delivered by the first pump provides kinetic energy to the influent fluid to promote turbulent flow within the fluid ring of the separator which results in the retention of contaminant particles on the exterior surface of the flux cartridge and the collection of the filtered fluid within an interior chamber of the flux cartridge; and,

a second pump in fluid communication with the separator capable of reversing the flow of fluid through the flux cartridge, wherein filtered fluid is pumped into the fluid ring from the interior chamber of the flux cartridge which provides for the removal of the contaminant particles from contact with the exterior surface of the flux cartridge and transports a substantial portion of the contaminant particles out of the separator.

2. The apparatus according to claim 1, further comprising:

at least one concentrator in fluid communication with the separator, containing at least one annulus disposed therein; and,

a flux cartridge with a semi-permeable membrane seated inside the concentrator annulus, wherein a fluid ring exists between the interior surface of the annulus and the exterior surface of the flux cartridge, wherein the contaminant particle waste and fluid flushed from the separator enters the interior chamber of the flux cartridge seated within the concentrator and wherein contaminant particles of a desired dimension are retained on the interior surface of the flux

cartridge and the filtered fluid is collected in the fluid ring of the concentrator.

3. The apparatus according to claim 2, further comprising:

a purge air source in fluid communication with the concentrator capable of providing pressurized air into the fluid ring of the concentrator for removing concentrated waste from contact with the interior surface of the concentrator flux cartridge and transporting the concentrated waste out of the concentrator.

4. The apparatus according to claim 2, further comprising:

a drying air source in fluid communication with at least one concentrator capable of dewatering the concentrated waste particles located within the concentrator.

5. The apparatus according to claim 1, further comprising:

a slipstream fluid path in fluid communication with the separator which acts to increase the turbulent flow of contaminated influent within the separator thereby enhancing the filtration efficiency of the separator.

6. The apparatus according to claim 1 further comprising a control panel which includes a plurality of control inputs for monitoring and operating the molecular separator apparatus by a user.

7. The apparatus according to claim 1 wherein the first pump pumps contaminated fluid influent into the separator through two alternating fluid paths, wherein the fluid influent is pumped through the first path by the upward movement of a piston inside the first pump and is pumped through the second fluid path by the downward movement of said piston.

8. The apparatus according to claim 1 wherein the flow of fluid into and out of the separator is controlled by at least one poppet valve.

9. The apparatus according to claim 2 wherein the flow of fluid into and out of the concentrator is controlled by at least one poppet valve.

10. The apparatus according to claim 1 wherein the separator can separate contaminant particles larger than fifty angstroms in dimension from a fluid.

11. The apparatus according to claim 1 comprising a plurality of separators which are operated in at least one of a series or parallel configuration.

12. The apparatus according to claim 1 wherein only one separator is in fluid communication with the second pump and wherein the flow of fluid received from the second pump is alternated between a plurality of separators at regular intervals and the filtered fluid from the plurality of separators that are not in fluid communication with the second pump bypass the second pump and flow directly into a collection reservoir.

13. The apparatus according to claim 2 further comprising a plurality of concentrators which are operated in at least one of a series or parallel configuration.

14. The apparatus according to claim 1 wherein at least one poppet valve controls the flow of fluid into the separator.

15. The apparatus according to claim 2 wherein at least one poppet valve controls the flow of fluid into the concentrator.

16. The apparatus according to claim 1 wherein a plurality of poppet valves are cycled incrementally to control the flow of fluid through the separator.

17. The apparatus according to claim 2 wherein a plurality of poppet valves are cycled incrementally to control the flow of fluid through the concentrator.

18. The apparatus of claim 1 wherein the molecular separator is detachably secured to a wheeled transport.

19. The apparatus of claim 2 further comprising:

at least one transition plate in fluid communication with the separator for distributing the influent fluid stream into the separator.

20. The apparatus of claim 1 further comprising:

at least one transition plate in fluid communication with the concentrator for distributing the influent fluid stream into the concentrator.

21. A method of separating a contaminant from a fluid stream comprising:

pumping a fluid having a contaminant into at least one separator and through a flux cartridge thereby capturing the contaminant on the flux cartridge and transporting the filtered fluid into the interior of the flux cartridge;

transporting the filtered fluid through a first outlet into a collection reservoir;

reversing the flow of the filtered fluid through the flux cartridge to dislodge the contaminant collected thereon and transporting the fluid and reentrained contaminant to a concentrator;

desiccating the fluid and reentrained contaminant in the concentrator so that a substantial part of the fluid is removed;

removing the substantially dry contaminant from the concentrator.

22. The method of claim 21 wherein the substantially dry contaminant is removed from the concentrator by a purge air source.

23. The method of claim 21 wherein a plurality of separators are operated in at least one of a parallel or series configuration.

24. The method of claim 21 wherein a plurality of concentrators are operated in at least one of a parallel or series configuration.

25. The method of claim 21 wherein the flow of fluid into the separator is controlled by at least one poppet valve.

26. The method of claim 21 wherein the flow of fluid into the concentrator is controlled by at least one poppet valve.

27. A system for separating contaminant particles from a fluid, comprising:

a separator having an annulus for receiving a fluid to be separated and a flux cartridge disposed within the annulus for removing contaminant particles of a desired dimension from the fluid;

a concentrator adapted to receive the separated contaminant particles from the separator; and,

a waste reservoir adapted to receive the separated contaminant particles from the concentrator.

28. The system of claim 27 wherein the fluid circulated through the system is pressurized.

29. The system of claim 27 wherein a first pump introduces the fluid containing contaminant particles into at least one separator.

30. The system of claim 27 wherein a second pump withdraws the separated fluid product from the separator.

31. The system of claim 27 wherein a second pump provides a pressure gradient within the separator so as to remove the contaminant particles from the exterior surface of the flux cartridge.

32. The system of claim 27 wherein a first pump provides a pressure gradient within the fluid ring of the separator so as to transport the contaminant particles from the separator to a concentrator.

33. The system of claim 27 wherein the contaminant particles are received into the interior portion of the flux cartridge seated within the concentrator.

34. The system of claim 27 wherein a first pump provides a pressure gradient within the interior portion of the flux cartridge seated within the concentrator so as to remove contaminant waste particles which are retained on the interior surface of the flux cartridge.

35. The system of claim 27 wherein a first pump provides a reverse pressure gradient within the interior of the concentrator so as to remove the retained contaminant particles from the interior of the concentrator flux cartridge.

36. The system of claim 27 wherein a fluid product collection reservoir is adapted for receiving the filtered fluid from the separator.

37. The system of claim 27 wherein a drying air source provides for desiccation of the particles collected within the concentrator.

38. The system of claim 27 wherein a purge air source provides for the removal of contaminant particles from the concentrator and transports the particles to the waste reservoir.